No. 8000132

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Foundation Seed Stocks, Agricultural Experiment Station,
South Dakota State University

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS [illegible] THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CREEPING FOXTAIL

'Retain'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington *this* 26th *day of* February *in the year of our Lord one thousand nine hundred and* eighty-one.

Attest:

Commissioner
Plant Variety Protection Office
Grain Division

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

INSTRUCTIONS: *See Reverse.*

FORM APPROVED
OMB NO. 40-R3822

No certificate for plant variety protection may be issued unless a completed application form has been received (5 U.S.C. 553).

1a. TEMPORARY DESIGNATION OF VARIETY	1b. VARIETY NAME	FOR OFFICIAL USE ONLY
SD 101 Creeping foxtail	Retain (~~creeping foxtail~~) D 1/19/81	PV NUMBER 8000132
2. KIND NAME: Creeping foxtail	3. GENUS AND SPECIES NAME: Alopecurus arundinaceus	FILING DATE 6/16/80; TIME 11:00 A.M. (P.M.)
4. FAMILY NAME (BOTANICAL): Gramineae	5. DATE OF DETERMINATION: (1) Feb. 1, 1979	FEE RECEIVED $ 500.00 / $ 250.00; DATE 6/16/80 / 1/05/81
6. NAME OF APPLICANT(S): Foundation Seed Stocks	7. ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code): Plant Science Department, South Dakota State University, Brookings, SD 57007	8. TELEPHONE AREA CODE AND NUMBER: (605) 688-5121

9. IF THE NAMED APPLICANT IS NOT A PERSON, FORM OF ORGANIZATION: *(Corporation, partnership, association, etc.)*	10. IF INCORPORATED, GIVE STATE AND DATE OF INCORPORATION	11. DATE OF INCORPORATION
Corporation	South Dakota	March 26, 1945

12. NAME AND MAILING ADDRESS OF APPLICANT REPRESENTATIVE(S) IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS: Jim Weber, Foundation Seed, SDSU, Brookings, SD 57007
Dr. James G. Ross, Plant Science Department, South Dakota State University
Brookings, South Dakota 57007

13. **CHECK BOX BELOW FOR EACH ATTACHMENT SUBMITTED:**

- [X] 13A. Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
- [X] 13B. Exhibit B, Novelty Statement.
- [X] 13C. Exhibit C, Objective Description of the Variety *(Request form from Plant Variety Protection Office.)*
- [X] 13D. Exhibit D, Additional Description of the Variety.

14a. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a). (If "Yes," answer 14B and 14C below.)* [X] YES [ ] NO

14b. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?	14c. IF "YES," TO 14B, HOW MANY GENERATIONS OF PRODUCTION BEYOND BREEDER SEED? B 6/20/80
[X] YES [ ] NO	[X] FOUNDATION [ ] REGISTERED [X] CERTIFIED

15a. DID THE APPLICANT(S) FILE FOR PROTECTION OF THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

15b. HAVE RIGHTS BEEN GRANTED THIS VARIETY IN OTHER COUNTRIES? [ ] YES [X] NO *(If "Yes," give name of countries and dates.)*

16. DOES THE APPLICANT(S) AGREE TO THE PUBLICATION OF HIS/HER (THEIR) NAME(S) AND ADDRESS IN THE OFFICIAL JOURNAL? [X] YES [ ] NO

17. The applicant(s) declare(s) that a viable sample of basic seed of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

May 19, 1980 (DATE) — James G. Ross (SIGNATURE OF APPLICANT)

May 19, 1980 (DATE) — Foundation Seed Stocks by James Weber Mgr. (SIGNATURE OF APPLICANT)

FORM GR-470 (1-78)

INSTRUCTIONS

GENERAL: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and $500 fee ($250 filing fee and $250 examination fee) to U.S. Dept. of Agriculture, Agricultural Marketing Service, Livestock, Poultry, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

6/5/78

ITEM

5 Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) of the Act and (2) the date a decision was made to increase the seed.

13a Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability.

13b Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty.

13c Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data.

13d Describe any additional characteristics that are not described, or whose description cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as, plant habit, plant color, disease resistance, etc.

14a If "YES" is specified (seed of this variety be sold by variety name only as a class of certified seed) the applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "NO," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.)

15a See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of Practice.

EXHIBIT A

Origin and Breeding of Retain Creeping Foxtail (1) & (2). Approximately 500 plants of Garrison creeping foxtail, whose origin is described in Agricultural Handbook No. 170 ARS, USDA revised 1972 were established in a nursery at the South Dakota Experiment Station, Brookings, in 1965. From one plant which retained its seed better than others, a nursery of 150 plants was set out in 1967. In 1969, a diallel crossing block of six plants selected for seed retention (five from the 1965 nursery and one from the 1967 nursery), was established from which seed was obtained for a nursery of 1,440 plants in 1971. After two years of evaluation, the best five plants from the standpoint of vigor and seed retention were used to make a synthetic called SD 101 and now named 'Retain'.

(3) This species is cross pollinated so some differences in height and also in seed retention occur when the plants are individually grown in a space planted nursery but under field conditions, where full stand is maintained, these differences do not affect the forage yield or the overall high level of seed retention of this variety. No plants considered to be nontypical of the variety have been observed.

(4) The stability and uniformity of this variety for the seed retention character is indicated by the close correspondence of the seed retention of the synthetic to the parents which were selected for this character. This variety is as uniform as the parent variety Garrison from which it was selected.

EXHIBIT B

Retain is a five-clone synthetic variety which retains its seed on the rachis of the mature panicle so it can be harvested with a sickle-bar combine directly. It is otherwise indistinguishable from Garrison creeping foxtail in its growth habit.

Comparisons of this variety have been made with Garrison because this is the only released variety grown in the United States and recommended in South Dakota. The seed retention of Retain is illustrated in Figures 1 and 2, and Figures 3 and 4 taken on July 10 indicating the seed retaining characteristic of Retain and the shattering that had taken place in Garrison. In Figure 5 harvesting of ripe seed of this variety with a sickle bar combine is shown. This is impossible with Garrison because its seed shatters before it is ripe. In Tables 2 and 3 the differences in seed retention are indicated at approximately 10 days after seed was ripe. According to the description of P-14762 (Agricultural Handbook No. 170, revised 1972) this variety shatters readily also. A description of 'Hesa' is not available because of its foreign origin, but according to J. L. Schwendeman (personal communication), it also shattered when ripe.

Novelty, therefore, is based on seed retention so this variety can be harvested using a sickle-bar combine which will make the seed more easily harvested and thus more available to farmers.

Figure 1

Figure 2

Figures 1 and 2 show the seed retaining characteristic of Retain on the left and far right in comparison to the shattering characteristic of Garrison in the central area.

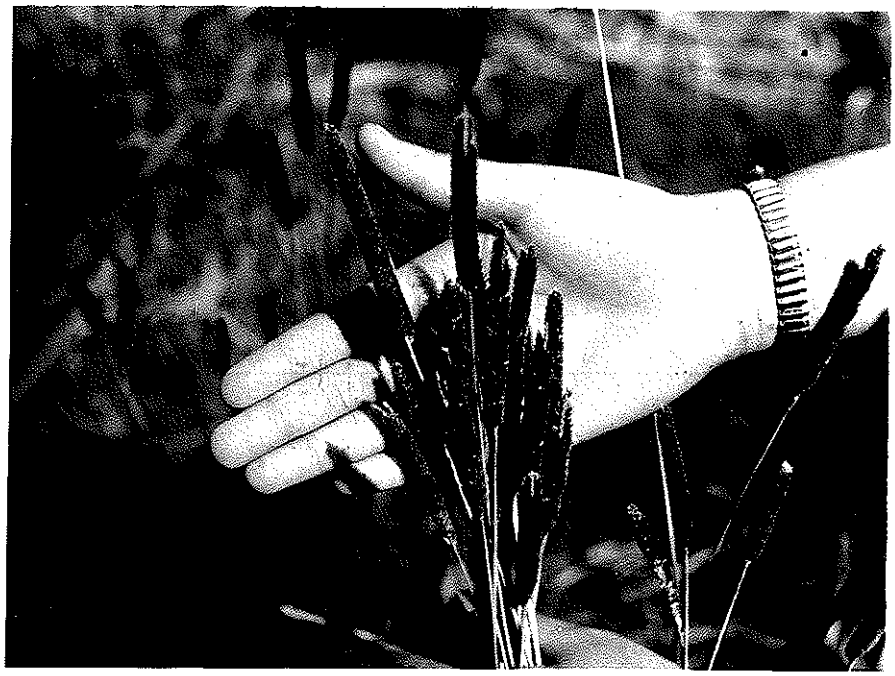

Figure 3. Retain creeping foxtail - July 10.

Figure 4. Garrison creeping foxtail - July 10.

Table 2. 1975 Ag Engineering Irrigation Test

Variety	Forage T/ac* 1976	1977	1978	Seed lbs/ac* 1976
Garrison	2.50 a	2.31 a	2.46 a	10.7 b
Retain	2.30 a	2.28 a	2.12 b	57.0 a

* Yields followed by different letters are significantly different.

Table 3. 1975 Brookings, Dryland Test

Variety	1976 Forage* T/ac	Seed* lbs/ac
Garrison	.56 a	4.0 b
Retain	.59 a	11.9 a

* Yields followed by different letters are signficantly different.

13c EXHIBIT C

Objective Description of Variety
Creeping foxtail
Alopecurus arundenaceus

Name of Applicant	Variety name or temporary Poir. designation
Foundation Seed Stocks	Retain

Address (Street and No.)

Plant Science Department
South Dakota State University
Brookings, SD 57007

Chromosome Number - 2n = 28

Adaptation

Cool season grass adapted to flooded areas in North Central and Pacific Northwest.

Maturity - 50% headed in Eastern South Dakota

Same as Garrison - mid-May

Plant Height - (at maturity to top of panicle)

100 cm - same as Garrison

Growth Habit

Erect (Garrison)

Rhizomes

18 cm length, .5 cm width
Medium creeping (Garrison)

Leaf Blade

Color - Dark green (Garrison)
Anthocyalmin absent (Garrison)
.3-1.0 cm width (Garrison)
Resembles Garrison in all respects

Panicle

Cylindrical dense panicles (Garrison)
4-10 cm long (Garrison), .7-.8 cm wide (Garrison)
Seed black at maturity (Garrison)
One floret per spikelet (Garrison)

Glumes and lemma and palea fall entire (Garrison)
Glumes sparcely pubescent, long-ciliate on the keel (Garrison)
Spikelets retained in the panicle so can be harvested more easily than Garrison.

Disease Resistance

Disease susceptibilities not noted but can be expected to be the same as Garrison.

Indicate the variety that most closely resembles the application variety for the following characteristics.

Leafiness	Garrison	Seedling vigor	Garrison
Earliness	Garrison	Seed size	Garrison
Yield of forage	Garrison	Seed retention	None

Comments

This variety has been selected out of Garrison for seed retention and resembles Garrison for other characteristics except this.

EXHIBIT D

Retain is similar to Garrison in its growth characteristics, heading in mid-May and well adapted to wet areas of somewhat saline nature.

In a test under irrigation at Redfield, as shown in Table 1, Retain yielded significantly more forage in 1976 and 1978 than Garrison and about the same in 1975 and 1977. Under irrigation at Brookings (Table 1), yields between the varieties were not significantly different in 1976 and 1977 but in 1978 Garrison yielded significantly more. Under dryland at Brookings in 1976 (Table 3) no difference was found. Seed yields were taken when considerable shattering had occurred, at a later maturity than harvest would normally be made. Five times as much seed was obtained from Retain than from Garrison under irrigation in 1976 and three times as much under dryland the same year. These amounts do not represent the seed production potential of Retain, only the seed retention differential between the two varieties. This seed retention differential illustrated in Figures 3 and 4, is much more pronounced because shattering in Garrison takes place before all the seed in a panicle is ripe and also before all the panicles are ripe. Some seed will form on later maturing panicles so the differences between the varieties becomes less the longer the seed of Retain is left after it is ready to harvest. Retain holds its seed so it can be harvested with a sickle bar combine when ripe but it shatters when left after the harvest date has passed as had happened at the time of harvest in Tables 2 and 3.

The seed production potential is indicated by the 1978 harvest of 281 lbs. of clean seed from the 3/4 acre Foundation increase field or 375 lbs. per acre. This was harvested with a sickle-bar combine.

SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

Department of Plant Science
Field Crops—Entomology—Pathology
—Soils —Weeds
Main Office, 219 Agricultural Hall
605/688-5121
Plant Science Building 605/688-5156

College of Agriculture
and Biological Sciences

October 28, 1980

Dr. Larry W. Dosier
Examiner, Plant Variety
Protection Office
U.S. Dept. of Agriculture
Livestock, Poultry,
Grain & Seed Division
National Agricultural Library Building
Beltsville, MD 20705

REFERENCE: Creeping Foxtail Application No. 8000132 'Retain'

Dear Dr. Dosier:

The seed retention trait in Retain is described, as you requested in your letter of October 8, as follows:

Glume, lemma, and palea color are blackish at maturity for both varieties, Garrison and Retain. The abscission layer forms in the pedicel at the base of the spikelet so disarticulation occurs in the same fashion in both varieties.

In Garrison the panicle tends to ripen and turn black from the top of the panicle downward. The abscission layer forms and disarticulation occurs as the spikelets become black, while at the base of the panicle the spikelets are still green. Panicles with various degrees of naked rachises occur as maturity advances. If harvest is delayed until the peduncle at the base of the panicle is straw colored, very little seed is left.

In Retain the panicle tends to ripen more uniformly so the abscission layer forms when the panicle is all black and the peduncle is straw colored at the base of the panicle. As maturity advances naked rachises are not evident. When all the spikelets are black and the peduncles at the base of the panicles are straw colored, this variety may be harvested with a sickle bar combine.

I have conferred with those who have helped in the breeding of this variety and they agree with this description. I hope that I have covered the points in question.

Sincerely,

J. G. Ross
Professor

JGR:vlp